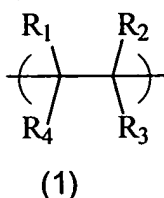
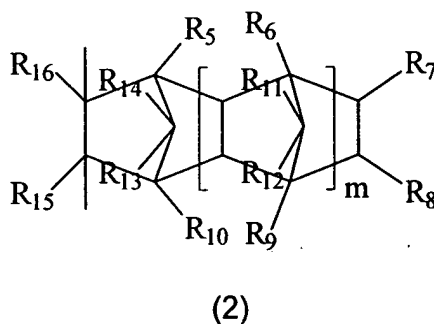


Claims

1. A photoresist composition comprising a copolymer, a photoactive component, and a solvent, where the copolymer comprises at least one ethylenic unit of structure 1 containing at least one cyano functionality, and at least one cyclic unit of structure 2, where structure 1 is



where, R₁-R₄ are independently hydrogen, alkyl, O-alkyl, alkyl ester, perfluoroalkyl ester, carboxylic acid, alkylcarbonyl, carboxylate, cyano(CN), fluoroalkyl, acid or base labile group, alkylsulfonyl, sulfonate, sulfonamide, alkylsulfonamide, providing that at least one of R₁-R₄ contains a cyano functionality, and where structure 2 is



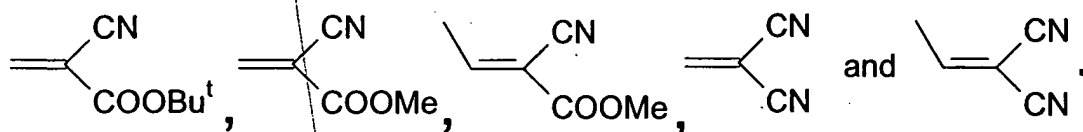
where R₅-R₁₄ are independently hydrogen, (C₁-C₆)alkyl, halogen, carboxylic acid, (C₁-C₁₀)alkylOCOalkyl, cyano(CN), (C₁-C₁₀) secondary or tertiary carboxylate, substituted pinacol, R₇ and R₈ may be linked to form a cyclic non-aromatic structure, fluoroalkyl, W(CF₃)₂OH, where W is (C₁-C₆)alkyl or (C₁-C₆)alkyl ether or an acid or base labile group,

R₁₅ and R₁₆ are hydrogen or (C₁-C₄)alkyl,
and m is 0-3.

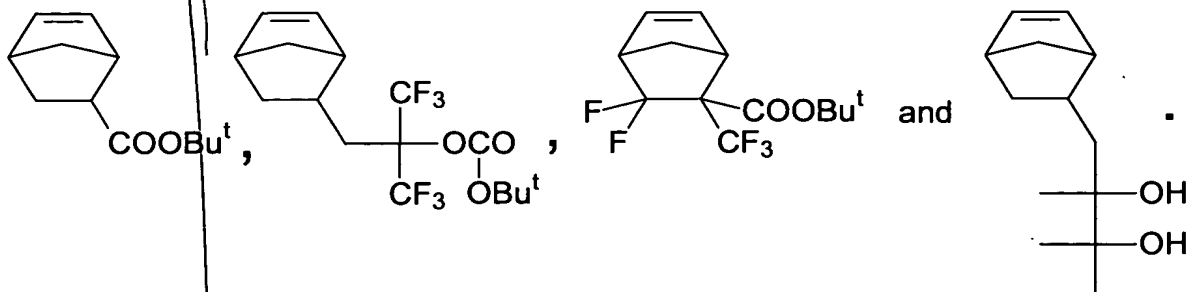
2. The copolymer according to claim 1, where the acid labile group is selected from tert-butoxycarbonyl, tert-pentyloxycarbonyl, isobornyloxycarbonyl, cyclohexyloxycarbonyl, 2-alkyl-2-admantyloxycarbonyl, tetrahydrofuranyloxycarbonyl, tetrahydropyranyloxycarbonyl, substituted or unsubstituted methoxymethoxycarbonyl, β -carbonyloxy- β -methyl- δ -valerolactone, β -carbonyloxy- β -methyl- γ -butyrolactone, tert-butoxycarbonyloxy, tert-pentyloxycarbonyloxy, isobornyloxycarbonyloxy, cyclohexyloxycarbonyloxy, 2-alkyl-2-admantyloxycarbonyloxy, tetrahydrofuranyloxycarbonyloxy, tetrahydropyranyloxycarbonyloxy, substituted or unsubstituted methoxymethoxycarbonyloxy, β -oxycarbonyloxy- β -methyl- δ -valerolactone, β -oxycarbonyloxy- β -methyl- γ -butyrolactone, tert-butoxy, tert-pentyloxy, isobornyloxy, cyclohexyloxy, 2-alkyl-2-admantyloxy, tetrahydrofuranyloxy, tetrahydropyranyloxy, substituted or unsubstituted methoxymethoxy, β -oxy- β -methyl- δ -valerolactone, and β -oxy- β -methyl- γ -butyrolactone, and where the acid labile group is connected directly to the polymer backbone or through a connecting group.

3. The copolymer according to claim 1, where R_7 and R_8 are linked to form a lactone or anhydride.

4. The copolymer according to claim 1, where the ethylenic unit is derived from the monomers selected from



5. The copolymer according to claim 1, where the cyclic unit is derived from monomers selected from



6. The copolymer according to claim 1, where the ethylenic unit is at a level of at least 40 mole %.
7. The copolymer according to claim 1, where the ethylenic unit is at a level less than 80 mole %.
8. The copolymer according to claim 1, where the weight average molecular weight is less than 200,000.
9. The copolymer according to claim 1, where the weight average molecular weight is greater than 1,000.
10. The copolymer according to claim 1, further comprising additional comonomers.
11. The copolymer according to claim 10, where the additional comonomers are selected from acrylates, methacrylates, styrenes, hydroxystyrene, hydroxyhexafluoroisopropylstyrene, vinyl ethers, vinyl acetates, tetrafluoroethylene, maleic anhydride and itaconic anhydride and their fluorinated homologues.
12. The copolymer according to claim 10, where the additional monomer is at a level less than 30 mole%.
13. The copolymer according to claim 1, where the copolymer has an absorption coefficient at an exposure wavelength of less than 4/micron.

14. The copolymer according to claim 1, where the solvent is selected from propylene glycol mono-alkyl ether, propylene glycol alkyl ether acetate, butyl acetate, xylene, ethylene glycol monoethyl ether acetate, propylene glycol mono-methyl ether acetate, 2-heptanone, ethyl lactate, ethyl-3-ethoxypropionate, mixtures of ethyl lactate and ethyl-3-ethoxypropionate, and mixtures thereof.

15. The photoresist according to claim 1, further comprising a dissolution inhibitor.

16. The photoresist according to claim 1, where the photoactive component is selected from a photoacid generator, a photobase generator or mixtures thereof.

17. The photoresist according to claim 13, where the photoacid generator is selected from diazonium salts, iodonium salts, sulfonium salts, sulfones, hydroxamic acid esters, halides and sulfonic esters.

18. The photoresist according to claim 1, further comprising a base.

19. The photoresist according to claim 16, where the base is selected from triethylamine, triethanolamine, aniline, ethylenediamine, pyridine, triphenyliodonium hydroxide, dialkylodonium hydroxide, and trialkylsulfonium hydroxide.

20. The photoresist according to claim 1, further comprising a solvent or solvent mixture.

21. The process of imaging a photoresist composition comprising the steps of:

- a) coating a substrate with a film of photoresist composition of claim 1;
- b) baking the substrate to substantially remove the solvent;
- c) imagewise irradiating the photoresist film;
- d) baking the photoresist film; and,

- e) developing the irradiated photoresist film using an alkali developer.

22. The process of claim 21, wherein the photoresist film is imagewise irradiated using light of wavelength in the range of 100nm to 300nm.
23. The process of claim 21, wherein the heating in step d) ranges from a temperature of from about 90°C to about 150°C for from about 30 seconds to about 180 seconds on a hot plate or from about 15 minutes to about 40 minutes in an oven.
24. The process of claim 21, wherein the alkali developer comprises an aqueous solution of tetramethyl ammonium hydroxide.

Add a³